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1. Introduction

Transport and Communication have played a critical role in the history of Europe, not only many centuries ago, but also in recent years. The European political and economic system has increasingly evolved from a set of relatively independent states into a collection of interacting economies connected by various types of network infrastructures. Economic development and infrastructure go apparently hand in hand. Therefore, the European economy will remain critically dependent on well functioning networks as catalysts for future developments. There is nowadays however a growing awareness (see e.g. Andersson & Strömqvist 1988) that the current European infrastructure network is becoming outdated, without being replaced by modern facilities which would position the European economies at a competitive edge. There is not only a problem of missing links (i.e., segments of the network), but even a more serious problem of missing networks as a whole. This problem has been discussed in a recent study for the European Roundtable of Industrialists (Nijkamp et al. 1990). The notion of missing networks refers here to the absence of strategic layers or components of Europe's transport and communications infrastructure, be it material or immaterial in nature. Thus, the term "missing networks" applies to the poor performance - in terms of convenience, speed, comfort, flexibility, reliability, costs, safety or social costs - of European infrastructure.

Despite much variation in transport and mobility among European countries, recent years have also witnessed many communalities in trends and policies regarding transport systems in Europe. Allmost all regions and countries in Europe face a major challenge, as rapid transport and mobility growth encounters increasingly strict limits: lack of capacity, lack of safety, environmental constraints and institutional inertia. The awareness of this friction between development and limitation is also shared by two other recently published European studies: "Transport in a fast changing Europe" (Group Transport 2000 Plus, 1991), and "Towards

Trans-European Networks" (Commission of the European Communicties, 1990). The former study makes a plea for fair competition in the transport sector through internalisation of the negative externalities. Furthermore it advocates a promotion of intermodal transport, an improvement of decisionmaking processes in the transport sector and a reorientation of financing towards variabilisation of transport costs and road pricing. The CEC document contains a European action programme in the transport sector. It identifies problems of transfrontier interoperability, inadequate legistlative environments, constraints linked to competition and a lack of an overall European view.

All three reports cited above accord in one respect: in recent years the European transport scene has shown a drastic increase in mobility and at the same time the environmental impacts of the transport sector threatens ecological sustainability. This has led to a situation where it becomes increasingly difficult to cope with the capacity problems in a future open Europe. In this paper, we therefore opt for an integrated view on missing networks, which include all aspects of the transport and communication problem.

Missing networks exist, because transportation systems are developed in a segmented way, each country seeking for its own solution for each transport mode without keeping an eye on the synergetic effects of a coordinated design and use of advanced infrastructures. Another reason for missing networks is the neglect of software and organisational aspects as well as financial and ecological implications. Therefore, a European orientation of transport policy for all modes and aspects of transport and communication is necessary in order to cope with the current problems of missing networks.

The problem of missing networks has primarily arisen in view of the European integration in the framework of the EC. Hence, the main spatio-economic concern is the integration of the national economies. A free flow of goods, persons and ideas is not feasible without a well performing transport and communications system. However, the presence of missing networks does not only have negative implications on European economic growth; it translates itself also into unbalanced forms of regional development. The evaluation of the regional impacts of different degrees of European integration and of the role played by interaction networks in this process is not easy to undertake. However, the scene is already set by the overall spatial tendencies in Europe, where transnational areas of similar economic strcture and performance can be identified. The regional relevance of missing networks in Europe is therefore developed in this paper in terms of these areas. Of course, the way in which the missing networks problem is solved has also implications for regional development and distribution on a lower spatial scale; this problem will not be adressed in this paper, however. But it will be argued that

the way in which the policy tasks are distributed among the federal levels (European, national, regional and communal) and the public and private sector, respectively, has important implications for the resulting spatial structure of Europe.

2. Missing networks in Europe

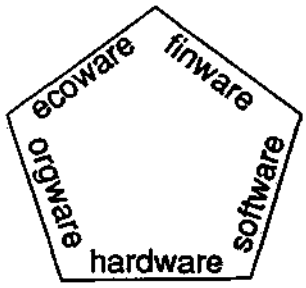
2.1. The Idea of Missing Networks

Networks consist of nodes and links - there is nothing new about that. But transport and communication networks are multi-modal and multi-functional and they extend accross national borders. For this reason, a map of a physical infrastructure network does not show very much, even though it may draw attention to missing links. The map does not tell the story of what happens on these links and at these nodes. The problems that are met when trying to analyse the capacity and performance of these networks relate very often to the non-physical sphere. For this reason, the notion of missing networks refers to the absence of strategic layers or components of Europe's transport and communication infrastructure, be they material or immaterial in nature.

In the past, the problems created by missing networks have been viewed as pure infrastructure bottlenecks with only two dimensions: viz., hard ware (physical infrastructure) and fin ware (funding). To realise the foreseen level of spatial interaction in an open Europe, a more comprehensive way of looking at networks is necessary. Here, five basic dimensions (critical success factors) of transport and communication networks are considered, which all have their specific relevance for the theme of missing networks, namely: hard ware (physical infrastructure), soft ware (logistics and informatics), org ware (institutional and organisational setting), fin ware (financial arrangements and funding) and eco ware (environmental impacts).

These five dimensions form a pentagon of concerns: a multi-layer view of networks which is a pre condition for the identification of missing networks.

Figure 1: A Pentagon of Concerns



Through this lense, missing networks are identified in 6 case studies of different types of transport and communication in Europe.

2.2. Missing Networks in European Freight Transport

The current bias towards passenger transport (e.g., the planning of high speed trains, maglev systems and electrocars) may prove to be fatal if it reduces awareness of the forthcoming problems in the domain of goods transport. A continuation of the vast growth of freight transportation (especially by road vehicles) must be expected. This increase will be amplified by the liberalisation of trade in Europe. Because of this, urgent attention must be given to this area in the light of the existing bottlenecks in freight transportation in Europe.

Bottlenecks in European freight transport can be identified at all layers of our pentagon of concerns. They relate to the capacity of road and rail networks and goods terminals. An important number of problems have been identified on the org ware level which relate to the inefficient use of the existing networks. The national orientation of the planning and operation of railways in Europe, the lack of separation between network and operation - except for Sweden, the absence of a clear Europe-wide tariff structure, the insufficient planning of the spatial structure of the freight transport network in terms of hubs and spokes for multi-modal solutions are together responsible for the under-use of the existing transport infrastructure in Europe. Concerning the software, the absence of logistics strategies as well as all instruments of combined transport to control the European wagon and truck fleet on road and rail are the most important shortcomings. In the finware domain problems arise with the funding of infrastructure projects which have a European impact while being planned by national

companies. A European approach to the integrated treatment of funding on the one hand and the equalization of economic and environmental benefits and costs is urgently needed.

A solution for many of the current problems is the realisation of a multi-layer network which combines transport on road and rail. The first layer would consist of a combined transport network, where the nodes would be big European freight terminals near the big European agglomerations and the links would be used by block trains running according to a strict timetable between these terminals on overnight journeys, if possible. This network would be based on a standardised container technology. The terminals would be equiped with advanced transshipment technology.

A second layer will have to be installed, based on what might be called soft technologies in combined transport. The nodes of this network will be the existing freight stations in Europe. These stations can be used for combined transport due to the use of transshipment techniques which allow drivers to change their loads (piggy back transport, road-railers, kettle lift containers). The links will consist of piggy back trains. This network links smaller centres all over Europe. The point of change between the two modes will be dictated only by logistic and market reasons and not by network restrictions.

This two layer system requires an advanced logistic system. A future integrated European Electronic Data Interchange (EDI) system for combined transport is urgently required which deals with the movement of freight on road and rail at the same time. Logistic centres placed at the big terminals should provide services on a commercial basis to any haulier who wants to operate combined transport.

Another solution concerns road haulage. Given that there are important capacity limits on the European road network, and that for financial and environmental reasons it will not be easy to expand the network significantly, measures must be found which allow for a more efficient use of existing roads. One solution might be a satellite based network of mobile telecommunication in the European truck fleet. The equipment of vehicles with on-board computers and communication systems make it possible to exchange information on position and load which leads to real time revisions of route assignments. The installation of such a system would lead to a considerable reduction of the movement of empty trucks in Europe, increase the efficiency of road transport and thus increase the capacity of the existing network enormously.

2.3.Missing Networks in European Airline Systems

The European airline system consists of a series of overlapping networks. These are the product of bilateral intergovernmental agreements on route authorities fare levels etc. (a network that will rapidly change after 1992), the infrastructure (hard ware) network with airports and airport access facilities normally under the national authority, the soft ware of air control and communication systems. Financing is typically a question of national public investment or public subsidies to the national airlines. Finally air traffic results in important social costs from noise and air pollution.

There are various forms of air transport networks, but none of them are complete. The key organisational network required to co-ordinate the overall system is entirely absent and aviation is overseen by a variety of agencies. Where networks exist, they are characterised both by the total absence of some facets (such as a common technology for air traffic control) and the lack of networks of sufficiently high quality provision (such as the adequacy of access to airports on the ground).

The European air traffic control is a patchwork of 22 systems operated out of 44 en route control centres. Some limited coordination exists in the framework of EUROCONTROL. The control system itself involves verbal contacts between ground control and pilots. This presents no problem in the US but leads to serious difficulties in air traffic control in Europe because of the multiplicity of languages used. Automated systems are available but the necessary network of computerised infrastructure is missing. Another bottleneck is the shortage of experienced air traffic controllers. The solution which would be compatible with a new network look at European air traffic control is the reduction of the number of air control centres. These will have to be equipped with powerful standardised main-frame computers (like in the US) and the installation of a Central Flow Managment Unit (CFMU). The main focus in the case of air traffic thus is on air traffic control and organisational and logistic solutions which will bring about a new European network.

An additional weak element in air transport is the extremely unfavourable pre- and post-transport times (by buses, taxis or trains). Rapid railway links from airport to major cities and the eventual interlinking with the new rapid train network might bring a solution.

2.4. Missing European High Speed Rail Networks

High-speed travel on rail is an excellent solution for many of the passenger transport problems in Europe because the distances between the major cities range from 200 to 1000 km, distances for which the rapid train is very competitive. Conscious of this challenge, the community of European railway companies of the twelve EC members plus Austria and Switzerland presented in 1989 a project for a European high speed network. This project redraws the European railway network map.

Such a project, in principle, introduces a network which has so far been missing. However, taking a multi-layer multi-national perspective some problems become immediately obvious. At the hard-ware level most technical problems have been solved, but the existing solutions are national ones. The only regularly running rapid train network - the French TGV - is running on tracks built exclusively for rapid passenger transport, while the German ICE is planned for both passenger and freight transport. Hence the effort of putting the national plans for improvement of rail transport in Europe onto a map does not in itself guarantee the achievement of a European network solution. To reach such a solution, important problems have to be solved on the orgware level. It is doubtful wether a European rapid train system will ever come into being if its planning is left in the hand of the national railway companies. A coordinating body to operate the services and/or distribute operations between companies according to competitive principles should be foreseen at a very early stage. The planning of the infrastructure, which is not independent of the chosen system, must also be undertaken by a centralised body, unless the national railway companies can agree on a common standard.

In the short term the realisation of the TGV Nord could serve as a test bed for the multinational coordination of rapid train planning involving several states. In the medium term, an integrated aproach is required and the European Community has a clear responsibility if this network is to come into being. The basic problem in this field is to find a compromise between national and Community interests mainly on the level of org ware and fin ware. A co-ordinating European infrastructure bank might be used to finance these high-speed projects.

Before the funding problems can be solved a solution to the incompatibility of the different national systems must be found. Otherwise the new wave will experience the same difficulties as the traditional trains with all the problems which arise at border crossings.

2.5. Missing Networks in European Common Carriage

From an economic point of view the idea of separating carriage and infrastructure in high-speed rail transport is based on the idea that networks have many of the characteristics of a natural monopoly. Consequently, if competition within a given mode is to be favoured, they should be separated from the use of the infrastructure, thereby realising a European concept of common carriage. Solving orgware and finware problems is essential for the realisation of such a strategy.

The development of the concept of common carriage must take account of many of the problems cited in the context of rail freight transport and the future rapid train system. In the process, many standardisation questions have to be solved.

The concept of common carriage on European rail can only be realised for transport between high ranking central places in Europe. Regional and national transport will be organised at the appropriate levels. At the European level a European Common Carriage Organisation will be necessary. This organisation will set standards and distribute slots on the rail system. Common carriage implies an integrative view to additions to the European train network, the closing of gaps, the retooling of certain tracks, especially with a view to the Eastern European countries. Authority should be given to the European Common Carriage Organisation with free entry to (private and public) parties meeting certain standards. Priority rules need to be set with respect to freight and passenger transport, feeder systems and regional traffic, while rules for concessions are needed which define bidding systems for routes and time schedules. However, overregulation should be avoided by limiting the power of this body.

2.6. Missing Networks in European Inland Waterways and Coastal Shipping

This is a domain where network solutions have been more or less absent. New canals take a very long time to be built. Hence the question is how the existing network can be used more efficiently. The only new link which will be provided is the opening of the Rhine-Main Danube canal in 1992. To make shipping on inland waterways competitive a harmonisation of regulations is called for especially concerning cabotage. Another problem that has to be solved is the modernisation of the fleet including the promotion of vessels which can be used for coastal transport and on inland waterways. To allow for multimodal solutions, there must be a compatibility between barges, cargo specifications, train terminals and port facilities, so that the different networks can be linked. A network which does not exist so far but which could be

especially important in relation to Eastern Europe might come into being if the deepsea and coastal transport are closely interlinked with inland waterways in the same way as is already the case on the Rhine and the French Rivers.

2.7. Missing European Telecommunication Networks

Two kinds of substitution potential exist at the present time in this respect. The first concerns the substitution potential for moving parcels around Europe more efficiently and quickly than postal services do today. Here a European express mail market has to be developed through deregulation together with the introduction of new standardised telecommunication services. The growth of express parcel companies in Europe indicates a rising demand for the efficient and quick delivery of documents throughout Europe. However, the prices for these services are very high, partly because the national PTT companies cannot provide a viable alternative. The deregulation of these services and the introduction of market pricing policies in PTT companies on a European level will create a new network. Concerning messages where the content and not the document itself is essential, a European network of electronic message services must be introduced. This is a question of turning national successes like the French minitel into performing European systems. To reach such a solution, standardisation is the most urgent problem to be solved. Once this has been achieved, higher capacity solutions based on ISDN bands can be realised. This calls for important efforts in the infrastructure hardware domain.

The second potential area for substitution starts from the fact that while the transport of goods cannot be by telecommunication, goods movement throughout Europe can be improved using telecommunications solutions. One possibility has already been mentioned above, namely orbital truck fleet management. A second possibility for a new European network is the area of electronic customs. European-wide equipment of vehicles with standardised electronic identification units (in analogy to the stripe code on consumer goods) will enable goods to be handled at borders more efficiently while retaining the necessary safety conditions. The proposed mobile equipment would identify owner, load, itinerary and other facts about the vehicle, but must be combined with investments in immobile facilities. The big advantage of the proposed solution is that the customs facilites would no longer have to be placed at the borders. For example, they could be located at the big European freight terminals, the ports and airports. Existing duty free warehouses which will no longer be needed in an open Europe could also play an important role in this network. At the borders or at any other "strategic" points on a link, all that would be needed is a detection device which reads the electronic plates

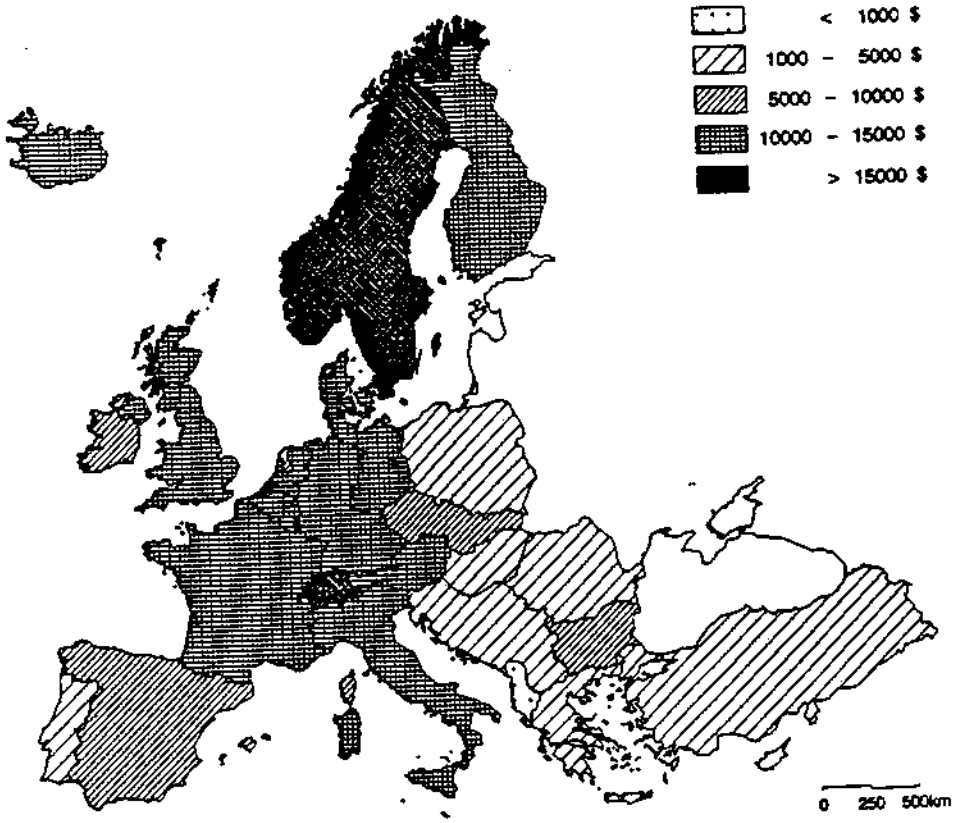
from the passing vehicles and transfers the information to the centres. Another advantage of this solution is that it could be combined with the fleet management network.

3. Regional Development in Europe

Regional disparities in Europe are still enormous. In the case of the EC, Masser, Sviden and Wegener (1990) report index figures for 1985. According to them, if the mean gross national product of Europe is taken as the reference index value (100), the figure for the richest region (Hamburg) is 218, while the poorest regions in Greece and Spain have an index value below 50 and some Portuguese regions one below 30. For the whole of Europe without Russia, the situation in terms of GNP per capita is given in Figure 2.

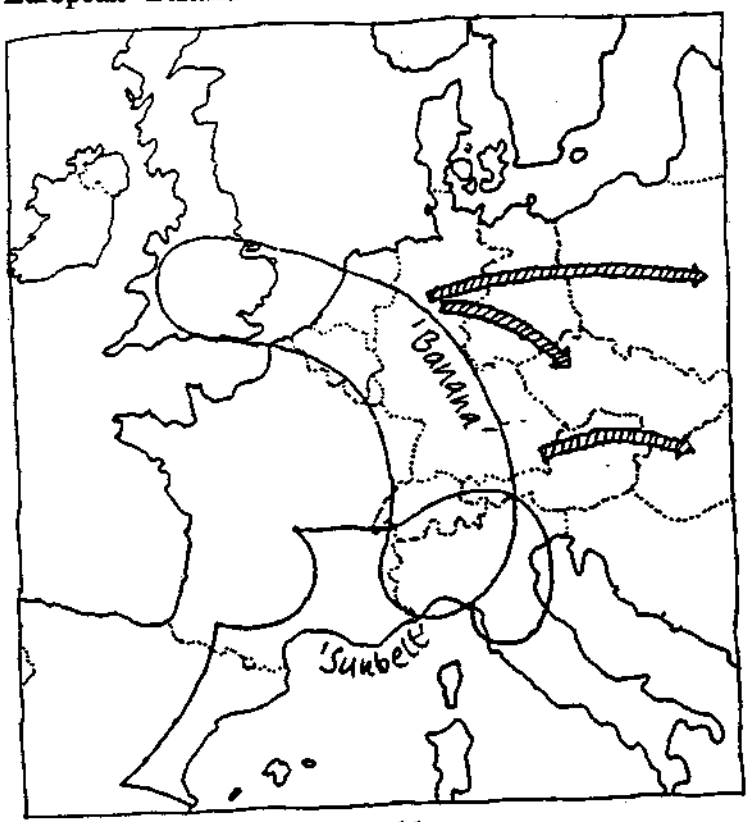
Most of the available statistics on the issue are for nations or for the regions within the EC. However, today and even more so in the future, the relevant dimension for regional aspects of development are and will be transnational. While the indices for income per capita may be relevant on a national level because they may reflect to some degree the wealth of the people in the whole country, due to national redistribution policy, they contain only limited information on the development potential of different areas. The dynamic regions can better be identified, if one considers growth and industrial structure across regions of all European nations. One such attempt has been made by the French national planning agency DATAR. They identified a highly developed area stretching from the South-East of England to the North of Italy and opposed this European "banana" to the sun belt area on the French and Catalonian Mediterranean coast (see Figure 3).

Figure 2. Gross National Product per Capita in Europe 1985



Source: Masser et al. 1990

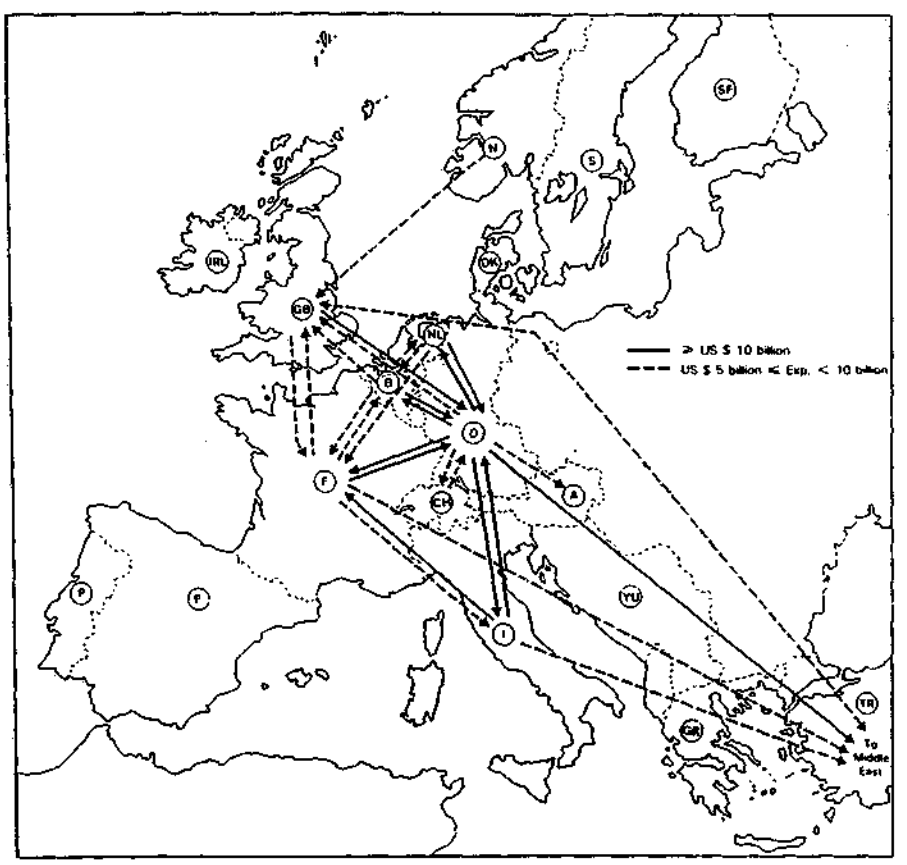
Figure 3: The European "Banana"



Source: Masser et al. 1990

The identification of this curved zone of intensive economic development has no doubt a high relevance. However, different authors draw different conclusions as to the strategic potential of this zone. While in Figure 3 the authors obviously see first a sun belt high technology area in the South, their illustration indicates also a belief in development potentials towards the East. Others hypothesize that most regions outside the Banana will have development problems because they diagnose an increasing concentration of high technology indistries, service sector activities and the necessary infrastructure investment in these regions. While the relevance of these alternative hypotheses cannot be established here, there is no doubt that the banana shaped area is reflecting an economic reality. Figure 4 presents a map of the export figures by country in Europe, where only the most important streams are indicated. The same North-East to South-West pattern emerges here.

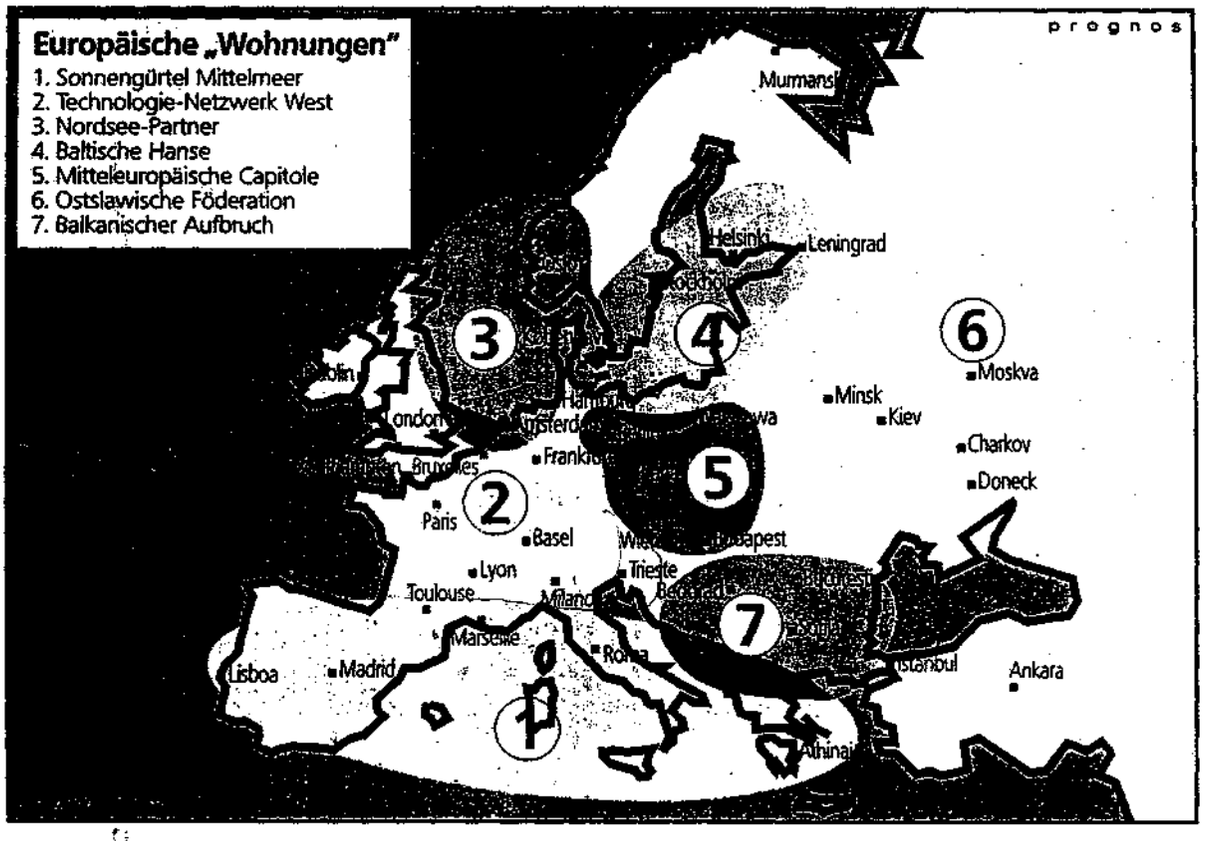
Figure 4: Main intra-European export relations in 1983



Source: ECMT 1986

Recently, with the opening of Middle and Eastern Europe, people have started to consider the European economic developement on an even larger scale and with a time horizon stretching far into the next century. An example is given in the map in Figure 5 presented by Lutzky (1990). This author divides the Europen "house" into 7 "appartments".

Figure 5: The European "Appartments"



Source: Lutzky (prognos) 1990

The first area is baptised "Mediterranean Sunbelt" and stretches from Istanbul to Lisbon. It is seen as an agrarian and tourist region and a work-bank for the high technology European center. Besides that, this area has its importance in the harbours and its links with Africa and the Middle-East. The second "appartment" is termed "Technology Network West" and reproduces the "Banana" extending it to Scotland and Ireland in the West and Trieste in the South-East. The European center contains the high technology industries, the service sector and research and development centers. Appartments 3 and 4 are the "North-Sea Partners" and the "Baltic Hanse". They are characterised by sea-related activities like harbours, ship-building and

the production and refinement of energy. The "Middle-European Capitals" are seen as a future center for administrative activities, research and development in the social sciences, trade and heavy industry. While the "appartment 6", "East-Slavian Federation", will mainly be producing primary material and agricultural products, the "Balcan Take-off" area is seen to have an importance in the production and distribution of food and household-goods.

This scenario can certainly be heavily critisized, mainly as being rather conservative. But it is no doubt developed on the base of present day economic realities. While the relevance of the spatial visions presented is difficult to establish, there is no doubt that the transport and communication policy in Europe will be a relevant factor in this process. Before turning to this question in the next section, it is important to note, that regional development is not only a matter of such large scale areas. The regional distribution of activities in terms of small regions and communes will be of great interest in the future. In contrast to the European banana and sunbelt model, there is also a growing awareness that the future map of Europe might consist of a large set of competitive urban agglomerations, forming the nodes of the European network economy. Not very much can be said on the future disparities in Europe on this level. But, with an increase in the spatial division of economic activities and functions, a phenomenon will gain in importance which is already relevant nowadays. The division of labour will produce wealth differences according to the productivity of the sectors and activities located in specific micro-regions. The wealthier states in Europe, and the EC too, have become used to correct the market distribution of income through heavy subsidies - most obviously in the case of the agricultural sector. If one foresees a division of tasks along the lines presented above, this will also have implications in terms of distribution of wealth, and hence might lead to a demand at the policy level for a redistribution of income. This will be an easier task in the rich countries than in the others. Hence, it might come out that the future brings a differentiation between relatively wealthy peripheries in the rich countries (due to redistribution) and and a "real periphery" in the rest of Europe.

This issue cannot be discussed further here. But some of the problems related to the question will be taken up in the discussion of the relationship between transport and regional development in the next section.

4. Missing Networks and Regional Development

Few people in the profession doubt that transport, communication and economic development are closely interrelated. However, the identification of causalities has not developed very far. Transport and communication networks are a necessary condition for a spatial and economic integration of regional and national economies and by that they are also a necessary condition of development through free exchange of goods and services. As pointed out by Nijkamp (1990), attention should not only be paid to comparative advantages of the regions and nations - a conception which stems from the era of more or less immobile resources between the nations - but also to economies of scale and scope, agglomeration economies and barriers in space. The opening up of space by means of transport and communication networks will accompany a regional development that will be guided by the possiblities to realise these economies. This, however, holds more for the economically more advanced countries in Western Europe. In Middle- and Eastern Europe some of the older ideas on regional development and policy are probably still valid.

The analysis of the form that the relationship between transport and regional development takes has led to ambiguous results. An early analysis by Clark et al.(1969) has shown that the development of regions is positively related to their economic potential in terms of accessibility of resources and income. Applications of this approach to the regional level within a nation have led to similar findings (e.g. Kesselring et al. 1982, for the case of Switzerland). However, authors like Hirschman (1965) have early pointed to the development potential created by social overhead capital. And Williamson (1975) has also argued that economic growth (and with that the development of the networks) are followed first by a stage of increasing regional inequalities which is then followed in a later stage by converging interregional income levels. Similar findings are presented in studies on processes of reurbanisation in Europe (see e.g. van den Berg et al 1982). These processes are again found to be closely linked to the development of the transport infrastructure (see e.g. Klaassen et al 1981).

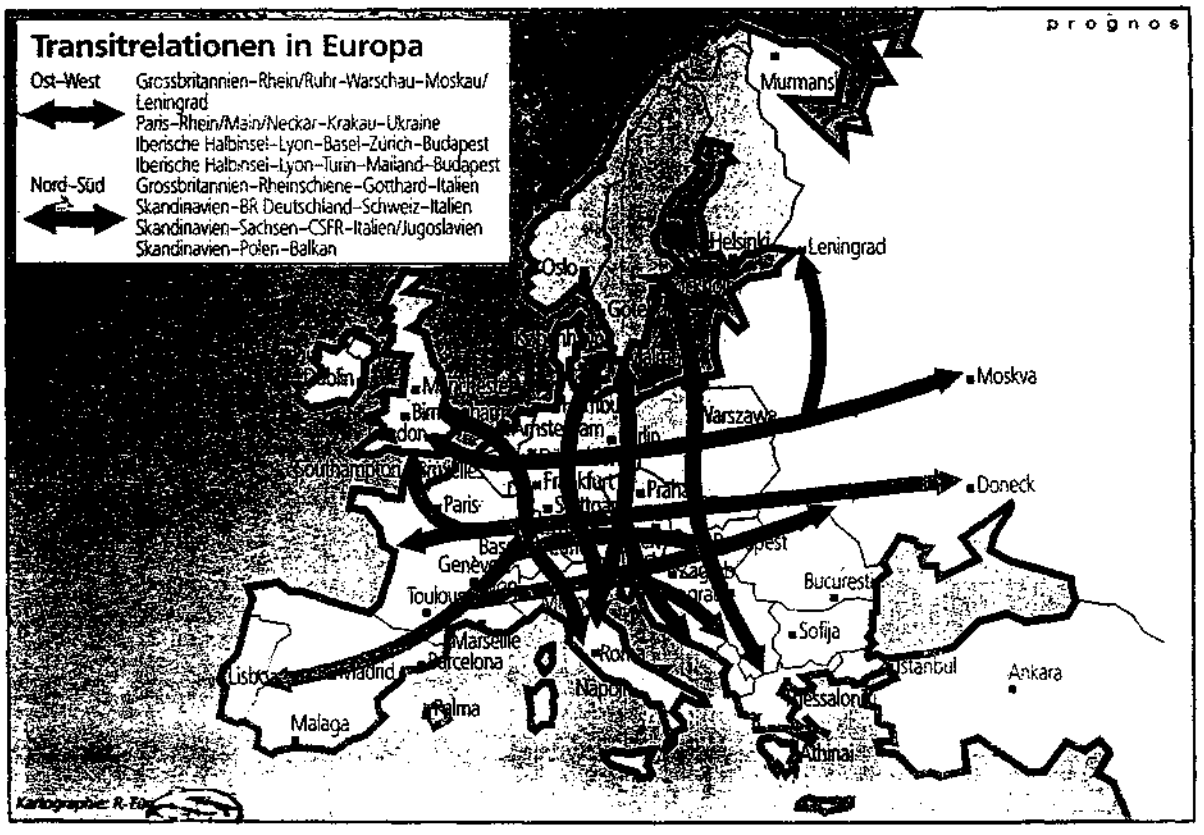
While there is no clear evidence for the possibility to promote regional development through network infrastructure, there is a common belief that these networks play the role of a catalyst, i.e. they reinforce existing processes of spatio-economic development. In this respect, the extension of these communicating facilities can be compared to a policy promoting free trade by lowering tariffs. The non-existence of performing transport connections can act like a protectionist tariff, i.e. preserve and protect regional or national economies with all its long term implications.

The catalyst function of the transport and communication network and the fact that no stable causalities can be found is also closely linked to the politico-economic cycle in which the expansion of the infrastructure is embedded. The growing regions will express a strong demand for the expansion of bottlenecks. If this demand is met by the political agencies this will allow a further growth of these areas. The question therefore arises, whether the missing networks might be used for regional policy goals. Two views can be taken. The first would be the Trans-European Networks approach of the CEC . This would imply that the problem of the missing networks diagnosed above must be solved by a European effort to increase mobility and make the flows more efficient. This would allow for a considerable integration effect in Europe. It can be expected, much in parallel to the Williamson hypotheses, that in a first phase, it would be to the benefit of the European "banana". It is then expected that gradually this growth will then spread to the peripheral regions in the same way as it has done on a national level.

The opposite view would opt for "squeezing the banana". It might be argued that the persistence of transport and communication bottlenecks together with the promotion of the relevant infrastructure in the lagging European regions would shift the future growth towards these regions. This is a problematic concept, however, because it neglects the scale and scope effects, and the existence of agglomeration economies cited above. While it is true that the future growth of the European center critically depends on the solution of the missing networks problems, the persistence of this problem is not necessarily to the benefit of the lagging European Regions. Much more probably other growth centers in the world, like e.g. the Pacific rim, would take over.

But then the question is, what is the strategic potential of the missing networks problem in terms of regional policy. In different contexts, like the European high-speed railway network, the European motorway network and other issues, new East-West links are put on the maps. These extended networks are then thought to reflect a future, where the North-South orientation of the European economic exchanges is joined by an East-West orientation. A good illustration for this view is again given by Lutzky (see Figure 6).

Figure 6: Transit relations in Europe



Source: Lutzky (prognos) 1990

This leads to the question, whether the integration of new areas through the establishment of new links or networks can promote regional development. As has already been said, these networks have only a catalyst function. Hence the promotion of transport infrastructure does not by itself create development. This means that the focus should not be on the new links in the first place, but rather on the new nodes. In other words, economic activities and transport and communication facilities should be promoted on a local and regional basis. Hence, solving the missing networks problem in the lagging regions should imply a regional policy which promotes infrastructure like freight terminals and logistic centers in relation with industry development. If only new links are established, without sufficient concern for the nodes, there is a risk that the lagging regions become pure transit areas. In this respect it is interesting to note that for the case of the sixties and seventies in Switzerland it was found (Kesselring et al 1982) that the extension of the small scale regional transport network is positively related to regional development. Hence, the inclusion in the European networks should at least be accompanied by a development of the national and regional networks. Some concern for the local development is also indicated by the finding that, especially in countries with a federalist structure, local

issues are often dominating in decision on large scale transport infrastructure project (see Maggi 1990). A good example is the local opposition against the TGV in Southern France and Belgium .

Such a strategy might eventually lead to a situation where peripheral regions in Europe can take over activities and functions from the congested centers. But in order to reach this stage, there is an evident need for a coordinated policy concerning the missing networks. This is shortly discussed in the concluding section.

5. Policy Conclusions

The conclusions are presented in the form of messages to policy makers in Europe.

The first message from the report concerns the predominance of national perspectives in transportation planning. Missing networks exist in Europe because transportation systems have been developed in a segmented way, each country and each transport mode seeking for its own solution without considering the synergetic effects of coordinated design and the use of advanced infrastructure. Because all economic development in space involves interacting networks, missing networks will sooner or later translate into missing economic development. Because of segmented national planning, there are European failures at the same time as national successes. New networks are created at the nations level - the national rapid train systems are an excellent example - but the corresponding European network exists only as a fanciful map.

The second message of the report is the importance of a European perspective in the analysis and resolution of transport and communication problems in Europe. This is not only a question of formulating a coordinated European policy but also points to the need for significant efforts towards standardisation. Lack of standardisation creates bottlenecks on all transport modes with the exception of air transport. These problems range from a lack of technical standardisation of cargo in combined transport on road and rail to problems with the width of canals and sluices on inland waterways. The greatest potential for standardisation is in rail transport (differences in gauges, voltages, frequencies and supply type, signalling systems and norms for using foreign traction on domestic rails as well as in free profiles and other things) and in telecommunications where the policies of the national PTT companies and developments in the NIT industries have led to the presence of an enormous variety of standards.

The third important message is the need for multi-modal solutions. Although there are many success stories concerning modal solutions at the national level, multi modal approaches are rarely found and, if present, are only of minor importance in terms of market shares. Nevertheless, it can be argued that the huge demand for additional transport capacity in Europe can only be met if multi modal solutions are pursued. This holds for passenger transport (e.g. rapid trains for medium distances combined with air traffic for long distances) as well as for goods transport (for example combined transport on road and rail). A third message of this report therefore is that in looking for new network solutions, a multimodal view is essential.

A fourth message is that future solutions are not to be sought primarily in new infrastructures, but in the more eficient use of exisitng networks. In the case of Eastern Europe this specifically relates to the rail mode and the inland waterways. There is some potential in this respect, if the intermodal possibilities are taken into consideration and if the necessary terminals and logistic nodes are planned. In the same time, the local and national network - primarily road, should be developed. This leads us to the final message.

The fifth message is for the national and regional policy agencies. If the above strategy is implied on a European level, the ensuing integration effects will disperse to the respective regions in Europe according to a strong economic logic. While this is not the place to call for a strong industrial policy and a competition of regions in terms of regional subsidies, a plea is made for a local and regional policy for the promotion of small scale networks. The degree to which regions will participate in the European growth will heavily depend on the integration of the regions in terms of efficient nodes in the network and of a performing local and regional transport and communication infrastructure.

Finally, a possible message for policy makers in Eastern Europe is the following: if the appartments described above do not seem acceptable in the case of a specific country or region, policy action is urgently needed because these appartments clearly describe existing trends. In so far as transport is foreseen as an instrument of regional development, the hard ware or infrastructural aspect will be of much more relevance than in Western Europe. The experience from regional policy in Western Europe is that transport infrastructure has both spread- and backwash effects. In order to avoid negative impacts for Eastern European regions, the promotion of performing local nodes and networks is therefore an urgent strategy.

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